Running profiles of recreational distance runners: race, training, spatiotemporal and anthropometrical characteristics

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Introduction

Every year, recreational distance running gains in popularity, with about 15% of the Western population that often goes for a run. The majority of runners seems to prefer short distances, as 50% that finished a road race performed a 5k run (Running USA, 2016). In this recreational running population, a sizeable proportion runs at slower speeds and some of these slow runners even run without a flight phase, which has recently been called grounded running (Shorten and Pisciotta, 2017). Surprisingly, little attention is paid to experimental studies investigating slow running speeds. As such, studies that focus on *slow* distance running in an experimental or in a recreational, observational context are rather scarce. Whereas the characteristics of the recreational running demographics are very diverse, running profiles that describe the different types of runners will provide a better understanding of this diversity in the recreational running community.

Purpose of the study

The purpose of this study was to characterize the slow running population by categorizing runners who participated in a recreational 5k running event according to their running speed. For each speed category, running profiles were created based on spatiotemporal (ST), anthropometric, race and training characteristics. The prevalence of grounded runners within each category was also calculated, as this locomotion pattern mainly occurs when running slow.

Methods

In total, 97 runners who ran in a recreational 5.2k running event participated in this study. At the start of the event, a questionnaire was filled in that checked for personal (age, gender) and training characteristics (running history, distance, frequency, speed and intensity). Anthropometric data was collected after the questionnaire was filled in, allowing the calculation of BMI. Spatiotemporal (ST) characteristics were observed (HS-camera; 125Hz, 1280x1024) at 4.66k in the race. If duty factor (DF), calculated as the ratio between contact time and stride time multiplied with 100, exceeded 50%, runners were categorized as grounded runners (GR). Two additional cameras (100Hz, 1020-780) were also placed at the 4.66k point and enabled us to calculate the instantaneous running velocity.

Results

The average instantaneous running velocity at 4.66k was 10.35 ± 1.76 $km.h^{-1}$. Based on this

speed, runners were subdivided into 5 speed categories. The slowest running group ran with a speed below 8.6 km.h^{-1}. Table 1 presents the race, ST and anthropometric data and table 2 presents training data, according to the categorization based on running speed. The prevalence of GR at the 4.66k point was 13.4%.

Discussion and conclusion

These data suggest that runners that are classified in the slowest running category (i.e. runners who run with a speed below 8.6 km.h^{-1}) seem to show some clear anthropometric and ST differences compared to faster running categories. The general characteristics of slow runners are: (1) > 45 years, (2) mostly female, (3) boarder-line overweight with a BMI around 25 and (4) a large proportion (2 out of 3) of runners that prefers GR above the traditional "aerial" running locomotion pattern. Surprisingly, these slow runners are not less experienced, nor seem to run less distance or less frequent compared to faster running categories. It is also interesting to note that with increasing speed, BMI and the percentage of female participants seem to drop.

References

Running USA. Annual Report 2017. Retrieved from: http://www.runningusa.org/2017-us-road-race-trends.

Shorten M.R., Pisciotta E. (2017, July). Running Biomechanics: What did we miss? In: *Proceedings of the 35th Conference of the International Society of Biomechanics in Sport*; (pp. 34-37).

Table 1. Runners (% of population), GR's (% in respective speed category), race, ST and anthropometric data according to different running profiles based on running speed.

SPEED	Runners (GR) (%)	DF (%)	BMI (kg.m^{-2})	Age (years)	♀ (%)
< 8,6 km.h^{-1}	16 (33)	50.90 ± 3.21	24.55 ± 3.67	45.73 ± 11.00	80,00
8,6 - 10,4 km.h^{-1}	39 (8)	45.75 ± 3.21	23.64 ± 3.47	39.84 ± 8.81	73,68
10,4 -12,1 km.h^{-1}	31 (0)	41.65 ± 2.60	22.45 ± 2.20	36.67 ± 9.54	60,00
12,1 - 13,9 km.h^{-1}	7 (0)	38.47 ± 4.83	22.66 ± 1.56	37.91 ± 10.56	0,00
> 13,9 km.h^{-1}	7 (0)	36.55 ± 1.20	21.81 ± 1.59	37.43 ± 4.39	0,00

Table 2. Training data according to different running profiles based on running speed. Training characteristics with values close to 10 represent more experienced runners, a higher weekly training frequency, longer distances ran at higher running speeds, and higher running intensity during a running session.

SPEED	Running history	Runs/week	Distance/week	Speed/training	Intensity
< 8,6 km.h^{-1}	8,00 ± 2,54	6,50 ± 2,07	4,11 ± 1,58	3,75 ± 1,30	5,91 ± 1,67
8,6 - 10,4 km.h^{-1}	7,09 ± 3,31	6,15 ± 2,09	3,82 ± 1,40	4,56 ± 1,15	6,18 ± 1,37
10,4 -12,1 km.h^{-1}	7,84 ± 2,81	6,00 ± 2,24	4,00 ± 2,03	5,45 ± 1,67	5,69 ± 1,64
12,1 - 13,9 km.h^{-1}	7,14 ± 3,04	5,36 ± 3,04	3,93 ± 2,83	5,36 ± 1,73	6,17 ± 0,83
> 13,9 km.h^{-1}	8,93 ± 2,83	6,49 ± 3,13	6,07 ± 3,18	8,33 ± 1,29	6,26 ± 0,96